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ABSTRACT

The opportunities offered by a natural history museum to enhance and expand classroom instruction in health are discussed. A basic constellation of typical natural history museum exhibit concepts and an array of health-related opportunities that are easily developed around these displays is outlined. The natural history concept provides an opportunity to explore community health, environmental health, and population dynamics. In the nutrition area population growth may be examined as well as food selection and availability and how food is assimilated by the human body. Displays on reproduction allow for clear and easily understood lessons in sex education that may not be presented quite as graphically in the classroom. Exhibits are available to provoke discussion on human beings and their unique forms and functions, on culture, and on disease control. Available also are illustrations of heredity, mental and physical fitness, and human migration as it reflects food chains and environmental stress. (JD)

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TEACHING HEALTH IN A NATURAL HISTORY MUSEUM

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Two thousand natural history museums dot this land. Can they provide a unique service to school health education programs? Yes, they can.

Although the few health galleries (museums) that exist today are found in science and technology museums, the perspective of natural history museums provides a more natural base for learning about man's health. The reasoning behind this is that natural history museums focus on natural objects, animals, vegetables, and minerals, describing and interpreting the relationships between these organic and inorganic elements of the environment, while science and technology museums tend to focus on man's achievements and use of these achievements. With this latter approach, exhibits and programs tend to deal with health in relationship to the dramatic advances of the medical sciences, describing health as a product of human ingenuity rather than a natural adaptation process that operates within the organic world. This basic difference in emphasis is a critical one, for in a natural history context health becomes more than achievable and predictable, it becomes understandable. With this awareness the responsibility for good health is removed from doctor's offices and hospitals, and is placed where it belongs--with each thinking individual. Therefore, good health is seen as the result of each person's understanding of his or her response to individual and collective environmental setting.

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This paper discusses some ways natural history museums can be useful to those involved in teaching about health. It describes what has taken place at the University of Nebraska State Museum as a result of an attempt to use a natural history museum setting to enhance health education efforts.

A Philosophical Foundation ...

To consider a natural history museum's place in health education it is important to recall the role of museums and the meaning of health. Perhaps the most common definition of the word museum is simply that of a building used to store, research or exhibit objects of art, history and natural history. A more significant meaning of the word refers to a museum as a place dedicated to the pursuit of learning. To muse originally meant to be astonished, to marvel and to wonder. In Greek mythology Muse was one of the nine sister goddesses, known as the inspirers of learning.

Health is generally considered a natural state. A person's health is the result of interactions between that person and the environment. In the classical epidemiological sense this relationship is identified as being between the host, the environment and the potential disease causing agent, usually part of the environment. These interactions, between the person and the environment, dictate the fate of the individual. It is this interaction of environment and person or other species, over time, which is commonly referred to as the natural history of the species. The health of the species, in other words, is an integral part of the natural history of the species. In fact, the health of the species is the determinant of the specie's natural history.

From another perspective, the health of an individual or a group of individuals can be seen as either a state or a process. The state of health is best represented by the absence of detectable disease while the process of health is best

reflected in an individual's ability to adapt and to survive the stresses and strains of the environment. This ability to adapt, which is suggested as an integral part of any definition of health, is also very much a part of natural history.

Man is a primate and exhibits the biological traits of all mammals. While the evolution of mammals in general has been characterized by somatic, skeletal and mental specialization and progressive adaptation, primate mammals have been distinguished by their lack of somatic specialization, showing however a high degree of progressive adaptability through such means as social organization, the development of technology and the other aspects of human culture. Biologically, humans can be distinguished by their upright stance and the associated skeletal changes, their relatively good binocular vision, the reduced significance of the jaw and nose, the development of a large brain, and their opposable thumb.

The most distinctive characteristics of humans are those associated with the development of the brain, including the ability for symbolic thought, the use of language and writing in communication, technological skill in modifying material and biotic environments, an extensive division of labor, and conscious behavior change.[1] These special characteristics and the significance of the organism's interaction with its environment, usually well illustrated in natural history, provide an essential foundation for the study of human health in a museum.

If natural history museums are places to learn and health is an integral part of natural history, as we suggested it is, then natural history museums should be excellent places to teach about health, especially human health. What then are the special opportunities and problems of teaching about health in a natural history museum? How do we apply the learning that can take place in a museum to our own independent lifestyles and the lifestyles of students we teach?

A Limitation ...

In teaching about health in a natural history museum the major problem is to relate the broad spectrum of museum exhibits and activities to personal health needs. We run the risk of losing the object of the lesson--health--in the natural history story. This basic problem then is one of transfer of learning. Transfer of learning, we have noted, will not necessarily take place unless particular care is taken to insure that it will. Direct connections between human health and what is seen and learned about in a museum must be carefully made. Students actively involved in the learning process seem to make these connections better than those involved in passive learning processes.

This problem arises in part from the fact that museums usually design exhibits around artifacts and concepts rather than educational objectives. Also, this problem is a result of the fact that for health teaching we are essentially extrapolating from exhibits designed for a different element of education: natural history. To overcome this difficulty we have begun to design new exhibits by first formulating educational objectives and then designing the exhibits.

The natural history museum can best be used to support a progression of learning which begins with the general--the eco-system--and moves to the specific. At a general eco-system level it can be learned, for example, that food supply is intertwined with the pattern of many diseases. At a more personal level it is clear that nutritional levels are related to Kwashiorkor and to coronary artery disease. At a very personal level the relationship of food to energy levels has been experienced by everyone. In natural history we see that disease can decimate a herd of animals but it will not take the lives of all the animals. Natural immunity, individual strength and other unique features may be involved in selecting which animals survive. Similarly, man also responds to the forces of natural selection. We can increase our odds for survival against certain

diseases through such means as immunization and the wise use of antibiotics, but only if we utilize the available options. The lessons of nature, in other words, also apply to humans but can be modified to the extent that humans consciously utilize that which their special capabilities have developed--in this case their medical/health knowledge.

Having moved from the general to the specific, or personal level of learning, the natural history museum setting allows for the application of newly acquired knowledge to the more general and larger environment. An example which flows from the disease/immunization example and illustrates this point is the question of whether the population increase resulting from the control of disease will be favorable or unfavorable. We can, in other words, move from the general to the specific and then apply or extrapolate back to the general eco-system level.

Museum-based health education programs should not be considered a replacement for good quality programs in the schools but they can significantly supplement the lessons of a good school health education program. Figure 1 illustrates a basic constellation of typical natural history museum exhibit concepts and an array of health-related teaching opportunities which are easily developed around these displays.

(Insert Figure 1 here)

An Opportunity ...

Museum visits by school classes are usually highlights of a semester's activities. As such they provide special opportunities to reinforce earlier learning and to expand on the meanings of other classroom activities. One of the special things we have observed in conducting museum based educational programs is that certain topics can be easily discussed in the museum setting which cannot be so easily discussed in a classroom setting. A clear example of this is the discussion of reproduction and childbirth.

We have in our museum a life-size series of models of the birth process complete in every detail. Not once in the past 15 years has anybody objected to their presence or objected to the content of programs related to these exhibits. In addition, a major teaching exhibit, a transparent woman, has been pregnant since she was installed some 20 years ago. As part of the educational program this exhibit relates the story of her pregnancy and mentions the function of the reproductive organs. In only one instance in 20 years has anyone expressed a concern about the exhibit and in this case the person had not yet seen the program. It is not clear what dynamics are involved in making these subjects acceptable in a museum setting and not acceptable in a classroom but we do have an untested hypothesis.

Discussion of these subjects is acceptable in a natural history museum setting vs a classroom because of the recognition of the role of reproduction in the story of natural history and/or possibly because the program is conducted from an electronic rather a personal source. Each of the systems of the body, its functions, and its support are important to the survival of a given individual. The lesson of natural history, which is the lesson of the survival of the species, is a lesson which makes reproduction absolutely crucial. Ideal health will provide a good life but without reproduction it will not provide the potential for the continuation of the life of the species. Reproduction and subsequent growth and development, therefore, cannot be ignored if we are to consider mankind's natural history. In this context there exists a high level of receptivity in the discussion of reproduction-related questions.

Also important to the discussion of this topic is the fact that a clear distinction can be made between humans and a good deal of the rest of the animal kingdom. Humans' long gestation period, and the long period of parent-child dependency and the development and importance of culture make our species unique.

These distinctions between Homo sapiens and other animals appear to be important in helping many people consider reproduction as an acceptable part of the story of humans and their health.

Special Programs ...

One of the best ways to supplement school health education programs is to provide extra opportunities for those who are interested to learn more about health. The question of additional elective classes in school, however, usually cannot be entertained very seriously because of staff and space limitations. Basic market research involving the questioning of parents and teachers in our community has indicated that special health education programs offered by the museum for select groups of people will be well received. It's true that perhaps the people who participate in these special programs are not the people who most need the extra educational opportunities but at least it is a starting point.

Preliminary investigations indicate that students in grades 4-6 are highly motivated to participate in special educational programs and that their parents are also motivated to cooperate. For this age range, many of the major community distractions of later years have not yet begun to take effect. Educational programs can be offered on a Saturday morning, but have to be at least two hours in duration. This is a consideration not based so much on the behavior of young people as on the behavior of parents. Taking a child somewhere for a shorter period of time is a significant inconvenience, but two hours provides ample opportunity for the parents to complete other activities.

To maintain students' interest in programs of this type, the activities must be varied and they must be "hands-on" participatory experiences. The addition of a product to take home from these classes significantly enhances the interest and attendance of the participants. "Hands-on" activities that result in

in something produced by the student to take home to show the parents, a primitive stethoscope for example, not only provides personal satisfaction for the students, but equally important, parents report that it enhances their satisfaction in that it reassures them that something useful is happening in the program.

Lastly, we have noted that the marketability for such programs is greatly enhanced if the local school system will endorse the programs and if the programs are promoted through school channels and/or school-supporting mechanisms such as the parent-teacher organization.

Research Potentials ...

Not to be overlooked in any discussions of the role of natural history museums in the improvement of health education programs is the role of research in program development. While the idea that museums are learning places is old, systematic attempts to evaluate their educational potentials and design more effective learning environments is relatively new. Research on museum use has largely been limited to descriptions of museum visitors. Recently, however, some significant attempts have been made to identify learning patterns and describe ways in which exhibits can be modified to enhance learning. For the health educator the challenge is to achieve both cognitive and affective levels of learning in an environment not designed principally for health education.

The natural history museum, or any museum for that matter, provides an ideal opportunity for the full range of participant observation research. Activities can range from the recording of students' reactions and questions as the researcher interacts as teacher or guide, to unobtrusive observations made from behind a one-way galss or via T.V. monitors. Traditional evaluation of exhibit characteristics and knowledge gain can be measured by pencil and paper tests. Participatory

exhibits and question panels can be built to record learner responses. The basic question, perhaps more difficult than the design of simple research-evaluation techniques, is the procurement of informed consent from the human subjects in such a way as to maintain the integrity of the evaluation design and not upset visitor satisfaction and enjoyment with the museum excursion.

Activities in Nebraska

Some 20 years ago, as a result of the health interests of an interested philanthropist, a few health related exhibits were introduced into the University of Nebraska State Museum. These exhibits remained essentially unchanged until recently. Through the continued interests and efforts of one physician, Dr. S. I. Fuenning, the idea of a set of health galleries in this natural history museum remained alive. The Nebraska Medical Society and its Auxiliary recently accepted the challenge of working with the University of Nebraska Health Education Department and the State Museum to develop extensive health education facilities as part of the state's natural history museum exhibit and educational services.

A three year planning effort has had a number of notable payoffs. First, University staff on an appointed planning committee have developed a productive working relationship with members of the medical society and its auxiliary. Second, members of this working group have learned a great deal of new information about health education and about each other's perceptions of health education. Third, this committee has developed a new appreciation for the role of museums in a community and the role of the community in supporting museums. Fourth, new ways have been identified to develop health related learning opportunities in a natural history museum and new ways have been developed to integrate health related exhibits into a natural history museum in a manner which is both philosophically sound and educationally meaningful. Fifth, health education, because of

visibility of this working group, has itself received heightened visibility within the state. Lastly, and perhaps the most notable of the benefits, has been the committee's ability to raise approximately $300,000 towards the estimated total cost of $600,000 needed to integrate a variety of health related exhibits to meet specific health education objectives

Personalized Learning ...

This joint planning process has forced a re-thinking of the total process of health education programs conducted in non-traditional settings. One notable result of this process is a recognition of the special advantage available to all who teach about health. To every health education experience the students, whether they be old or young, bring to that learning experience their own laboratory--their bodies.

Instead of focusing the attention of the learner solely on the exhibits, the blackboard or the screen, we have learned that museums, and indeed all health education, provide a significant opportunity to focus the learners' attention back to themselves. As a result of this basic recognition part of the planned facilities will serve as a sensory stimulation area. In this area environmental modifications will be used to illustrate basic lessons related to health. For example, the lighting will be designed to illustrate basic principles of vision and visual perception; the sound system will show the range, limitations and role of hearing in adaptation; the textures of the walls and the elevation of the floor will provide opportunities for activities aimed at teaching about touch and kinesthetic sense. Even the air circulation system is designed to inject odors into the room for use in teaching about the olfactory system. Not only will this area enable learning about form and function but more importantly lessons related to protection, early signs of malfunction and the management of risk factors will

be possible. Activities in this sensory stimulation area will not replace traditional classroom activities, but will highlight and reinforce them.

In Summary

This paper suggests that a museum is a place in which to learn and that a natural history museum is an ideal place to supplement teaching and learning about health. Museums can significantly supplement and highlight classroom activities. Our experience in Nebraska has illustrated that natural history museums by their very nature and theme can be instrumental in teaching about health. Also, we have learned that community groups like state medical societies and their auxiliaries can become interested enough in health education to assist in planning, fund raising and programming.

REFERENCES

1. Cohen, Yehudi A., Man in Adaptation: The Biosocial Background, Aldine Publishing Company, Chicago, 1968.

FIGURE I

EXAMPLES OF NATURAL HISTORY CONCEPTS AND THEIR APPLICATIONS IN HEALTH EDUCATION

NATURAL HISTORY CONCEPT	HEALTH EDUCATION APPLICATION
HABITAT (Ecosystem-Niche-Community)	Community Health Environmental Health Environment in Agent-Host-Environment: Epidemiology Ecology Urban & Rural Health Differences Mental Health Population Growth
NUTRITION (Predation, Range, Energy)	Food Selection Food Availability Population Growth Nutrition Processes Feeding Systems: Digestive Respiratory Circulatory Excretory
REPRODUCTION	Cell Division Growth & Development Mating/Marriage Socialization
FORM & FUNCTION	Human Beings Unique Form and Capabilities --conscious behavior --health benefits of culture: --medicine --group activities, consumerism --disease control
POPULATION DYNAMICS	Reproduction Disease/Infection Heredity Fitness/Mental & Physical Migration Stress